

THE SAFETY AND RELIABILITY OF THE U.S. NUCLEAR DETERRENT

Hearing of the Subcommittee on International Security, Proliferation, and Federal Services
Committee on Governmental Affairs
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Opening Remarks

Mr. Chairman, Senator Levin, and members of the committee, I am the Director of Lawrence Livermore National Laboratory (LLNL), one of the three Department of Energy (DOE) laboratories responsible for the safety and reliability of the nuclear weapons that comprise our deterrent forces. We are an integral part of efforts being implemented by DOE Defense Programs to maintain confidence in the safety and reliability of the U.S. nuclear weapons stockpile without nuclear testing or new weapon development.

Livermore's commitment to maintaining a safe and reliable nuclear weapons stockpile is an enormous responsibility—an undertaking described by President Clinton as being “a supreme national interest of the United States.” As steps are taken to reduce global nuclear arsenals and prevent proliferation, the nation must retain sufficient nuclear forces to deter any adversary. My responsibility is to assure the President that nuclear weapons in the enduring U.S. arsenal remain safe and reliable. To date I have been able to provide such assurances with confidence even though we last conducted a nuclear test in 1992. The challenge will become greater as the weapons continue to age beyond their designed lifetimes and as experienced nuclear weapons designers retire.

Our Laboratory is strongly committed to making the Department of Energy's Stockpile Stewardship and Management Program (SSMP) work. This program is designed to maintain the safety and reliability of the U.S. nuclear weapons arsenal that underpins national security within the constraints of a CTBT. I enthusiastically support the SSMP and am quite optimistic that we will achieve the very challenging program goal of preserving confidence in the stockpile.

Changing National Needs and Technical Programs

The SSMP builds on the fact that mission of the nuclear weapons programs at Livermore has changed in a fundamental way. We have moved from the weapon-

development paradigm of the Cold War (design, test, and build) to a weapon-assurance paradigm (stockpile surveillance, assessment, and refurbishment). Now there are no requirements for new nuclear weapon designs and our responsibility is maintenance of the reliability and safety of a stockpile consisting of nuclear weapons that are well-tested—they have a good pedigree. However, the weapons are aging beyond their intended lifetimes and there will inevitably be changes in the weapons, some of which will require a “fix” that in the past would have been validated by a nuclear test.

To meet the challenge, we are able to build on the substantial increase in our understanding of the fundamentals of weapon science that we achieved in the decade leading up to the cessation of nuclear testing in 1992. In addition, we expect that we can continue to increase our knowledge base of nuclear weapons physics through nonnuclear testing and advanced computer simulations, which will significantly compensate for the cessation in testing. The SSMP is making use of—and in some cases driving—tremendous advances in technology. The SSMP will implement advanced surveillance technologies to anticipate the detailed effects of aging together with advanced, flexible manufacturing technologies to greatly reduce the cost of required refurbishment without introducing new defects. We are rapidly advancing the state of the art in supercomputing and we are pursuing the design and construction of major experimental facilities that will enable weapon scientists and engineers to resolve important stockpile issues and validate their physics simulation models. These new capabilities will be developed and tested by experienced weapons scientists and engineers, who will then train the next generation of stockpile stewards to use the new tools correctly.

The ultimate measure of SSMP success will be our continuing ability to assure the President on a yearly basis the safety and reliability of the stockpile without nuclear testing. The program includes formal processes, conducted with the Department of Defense (DoD), for validating assessments of stockpile performance and modification actions. The processes, which we will seek to improve as we gain experience in them, fundamentally depend on the use of expertise and capabilities at each of the laboratories and independent evaluations—widely referred to as “peer review.”

Should the SSMP fail to achieve its objectives, vitally important safeguards specified by the President on August 11, 1995, allow the U.S. to resume nuclear testing if the deterrent is judged to be at risk.

A Highly Qualified and Experienced Technical Staff

Confidence in the stockpile since the beginning of the nuclear age has relied on much more than the limited number of development and stockpile confidence tests we conducted at the nation’s nuclear test sites. During weapon development we did not test designs at all extremes of conditions anticipated during stockpile lifetime and potential use. Nevertheless, national leadership has had full confidence in the system that maintains U.S. nuclear weapons and in the judgments of the technical staff. In the future, the nation will be even more reliant on these judgments, their supporting scientific capabilities and tools, and

the peer review processes established to ensure rigorous critique of the work performed. Accordingly, the SSMP will develop the skills and capabilities of the next generation of stockpile stewards. This requires moving ahead with the SSMP as rapidly and completely as possible so that our current cadre of experienced scientists will be available to both train and evaluate the skills of their successors. They will provide an extremely important assessment of both the people and their capabilities in implementing the SSMP, and thereby will contribute in a major way to a determination that the SSMP is indeed successful.

Sustained Program Support

My greatest concern regarding the success of the SSMP is the possibility of a lack of timely and sustained support. Maintenance of the safety and reliability of the nation's nuclear weapons stockpile is an extremely important matter and difficult challenge. Program support must be timely because we must get on with the task before existing experienced people retire or leave to pursue other endeavors. In addition, the support must be sustained at an adequately funded level because every element of the SSMP is needed for the success of the program as a whole. The technical risks in SSMP will be significantly greater if we are forced to stretch out activities in time or reduce the scope of planned research activities to meet more constrained budgets.

Summary Remarks

The DOE's Stockpile Stewardship and Management Program has been formulated and is being pursued to assure the safety and reliability of the U.S. nuclear weapons stockpile in the absence of nuclear testing. We must retain confidence in the nuclear weapons themselves, in the system that maintains them, and in the judgments of the technical staff, who will rely on experimental and computation tools to obtain needed data. So far, the quality of the stockpile and the implementation of the SSMP have enabled me to certify to the President the safety and reliability of our weapons without the need for a nuclear test.

Livermore is strongly committed to making SSMP work. Provided that the SSMP continues to receive strong bipartisan support and we proceed expeditiously, I am quite optimistic that the program will enable us for the foreseeable future to maintain confidence in the stockpile.